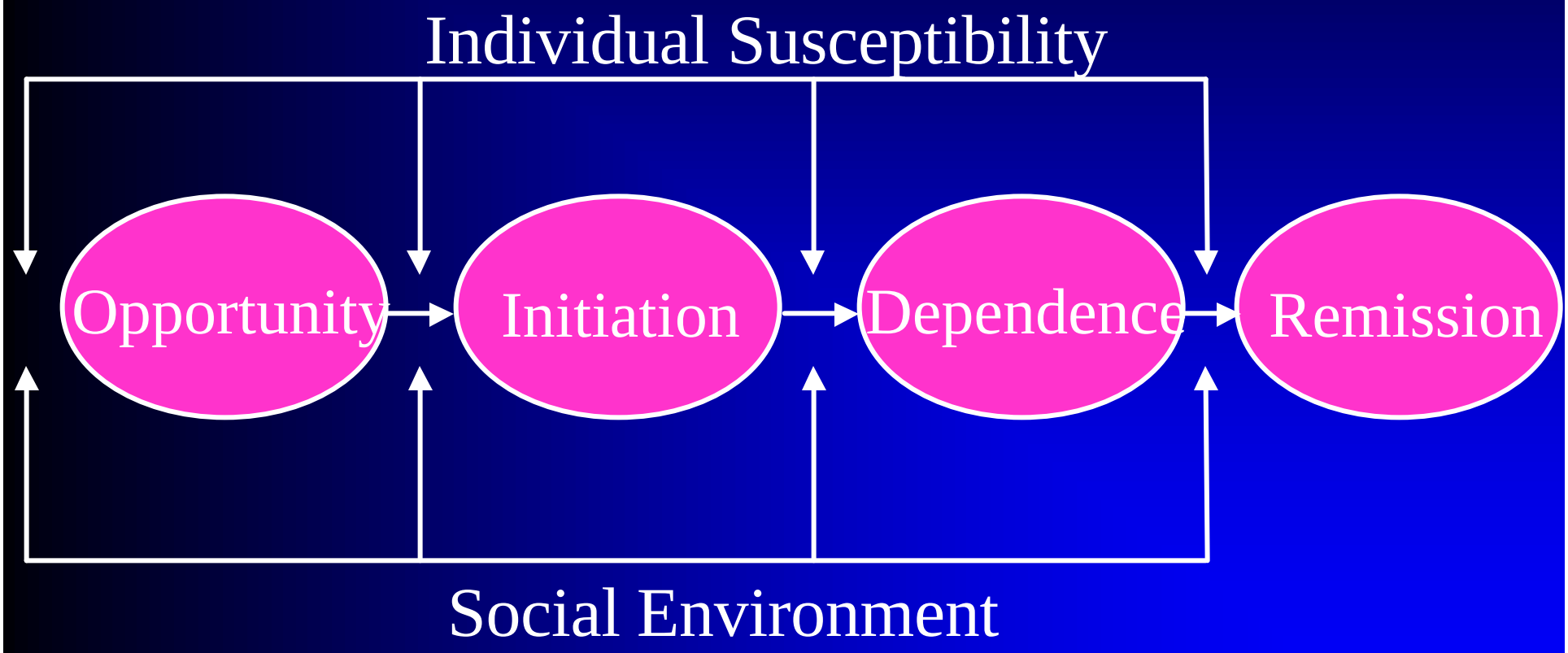
# Types of Epidemiology

- Descriptive
  - Examining the distribution of a drug abuse in a population and observing the basic features of its distribution in terms of time, place, and person (e.g., cross-sectional study like Monitoring the Future; surveillance like CEWG)
- Analytic
  - Testing a specific hypothesis about the relationship of a disease to a putative cause - relate *exposure* to *disease* (e.g., cohort studies)

# Clues From Analytic Epidemiology

- High male to female ratio
- Higher rates in genetically similar individuals (i.e. addiction runs in families)
- High rates of psychiatric comorbidity, especially:
  - Antisocial Personality Disorder
  - Bipolar Affective Disorder
  - Schizophrenia

# Conceptual Framework



# Analytic Epidemiology: Longitudinal Research

- Program of longitudinal research
  - Control for temporal sequencing
  - Identify putative causal factors and pathways to drug abuse
  - Focus historically on single factors, need to examine interactions
- For example:
  - Robins/Price: Longitudinal study of Vietnam Veterans

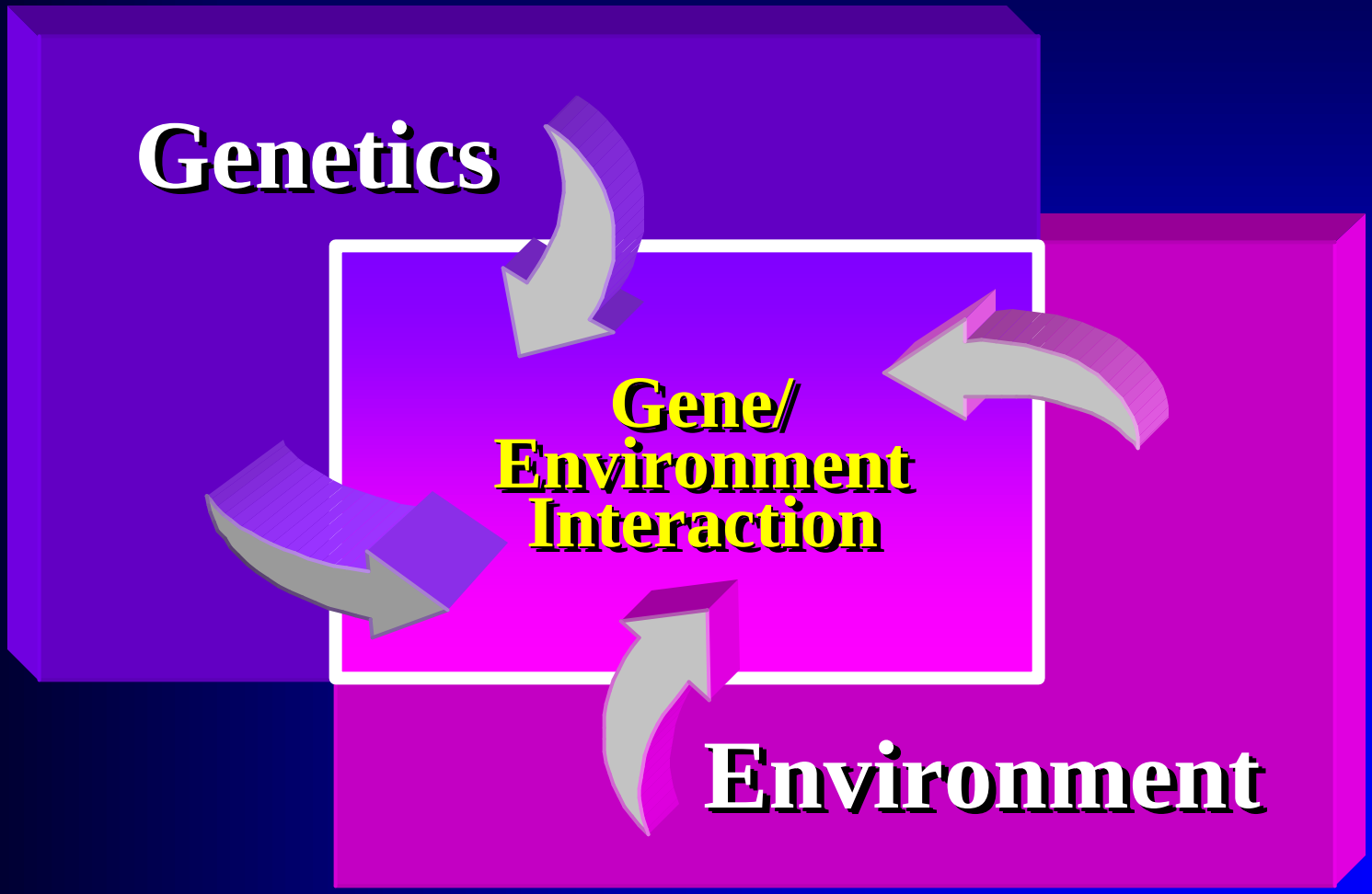
# Vietnam Veterans Study

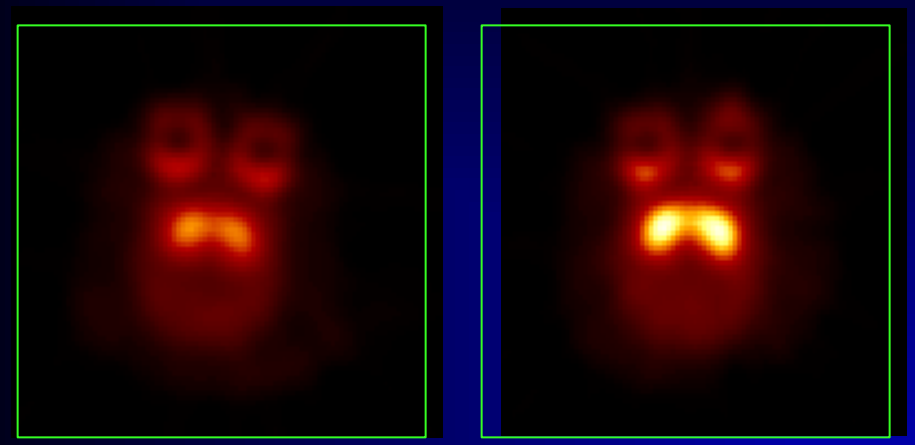
- Robins et al. (1973)
  - Only 5% of men addicted to opiates in Vietnam relapse within 10 months following return to US
  - Only 12% relapsed (even briefly) with 3 years
- Price et al. (2001)
  - 30 year followup showed increased mortality and psychiatric morbidity among those veterans who were heroin users in Vietnam and/or post-Vietnam

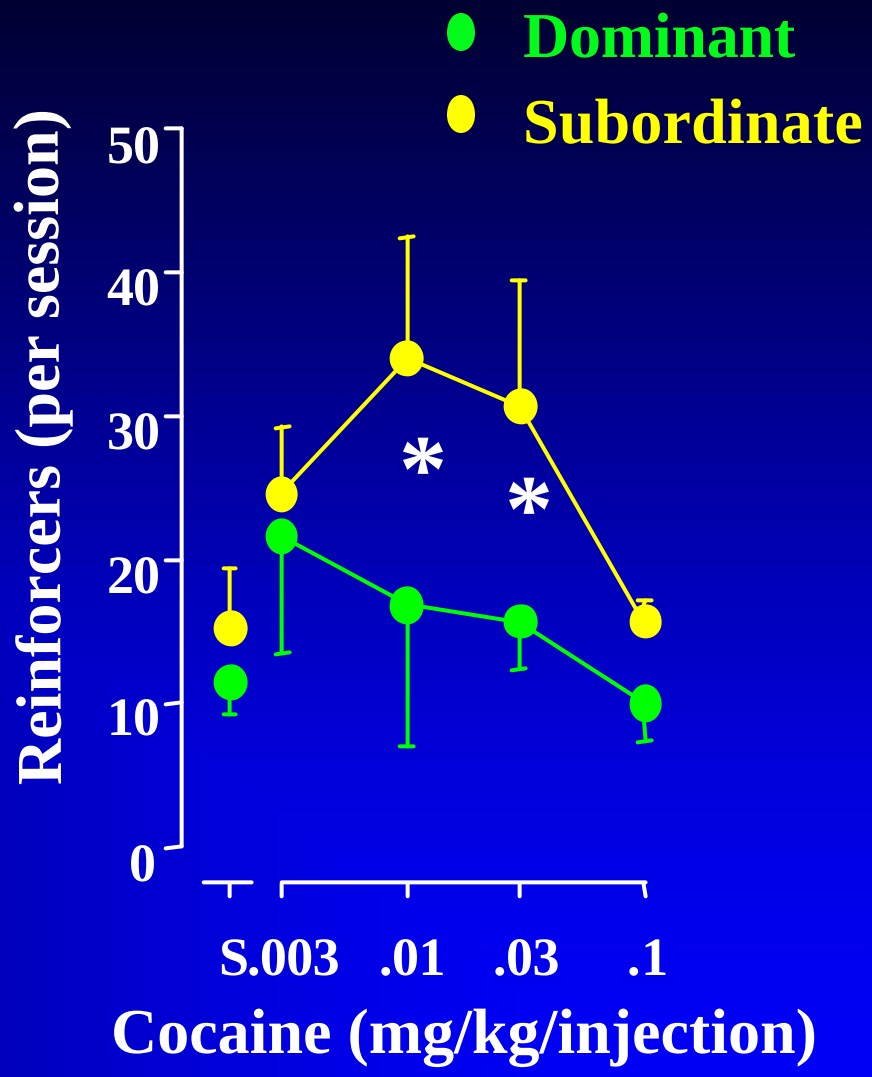
# Genetic Causes? Yes, but *not* single gene mendelian inheritance. The evidence…

- Family Studies show that substance use disorders aggregate in families with *some* specificity for different substances
- Twin Studies show 40 to 60% heritability for drug abuse and alcoholism
- Adoption studies show clear genetic risk for addictions with a complex pattern

# Gene/environment Interactions As Key To Understanding Causes

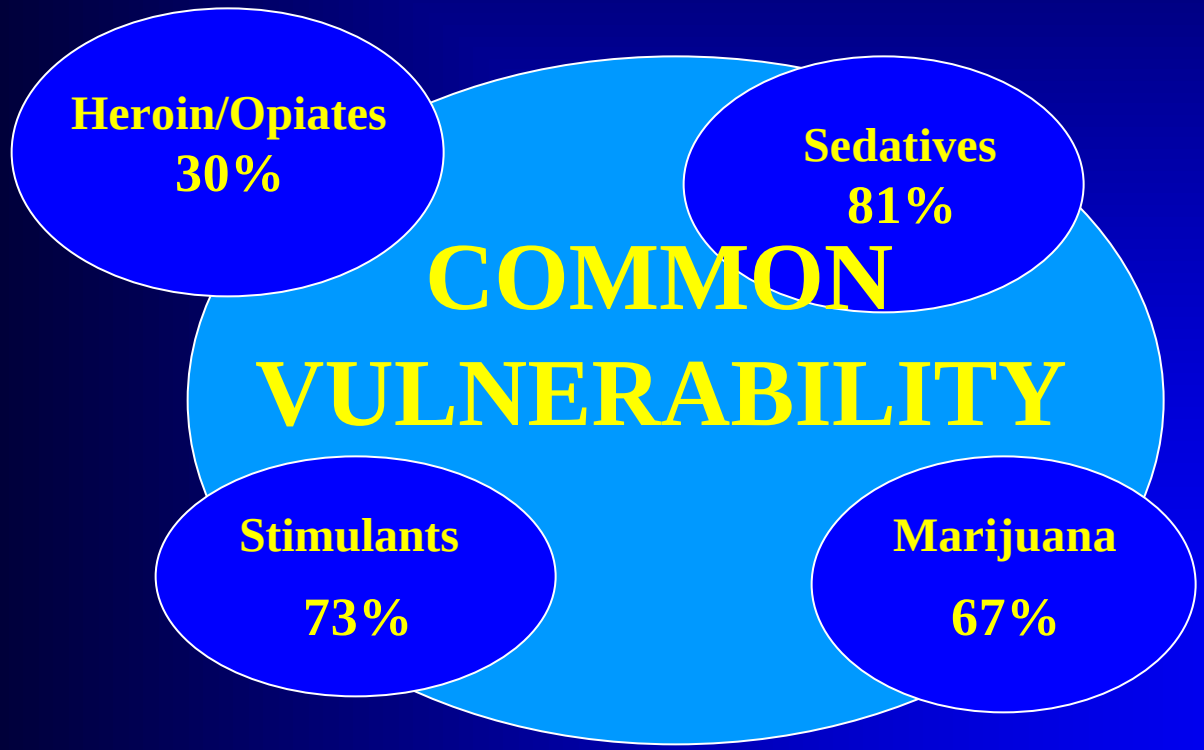





*Morgan, D. et al. Nature Neuroscience, 5: 169-174, 2002.*

# Shared Genetic Variance for Illicit Drug Use



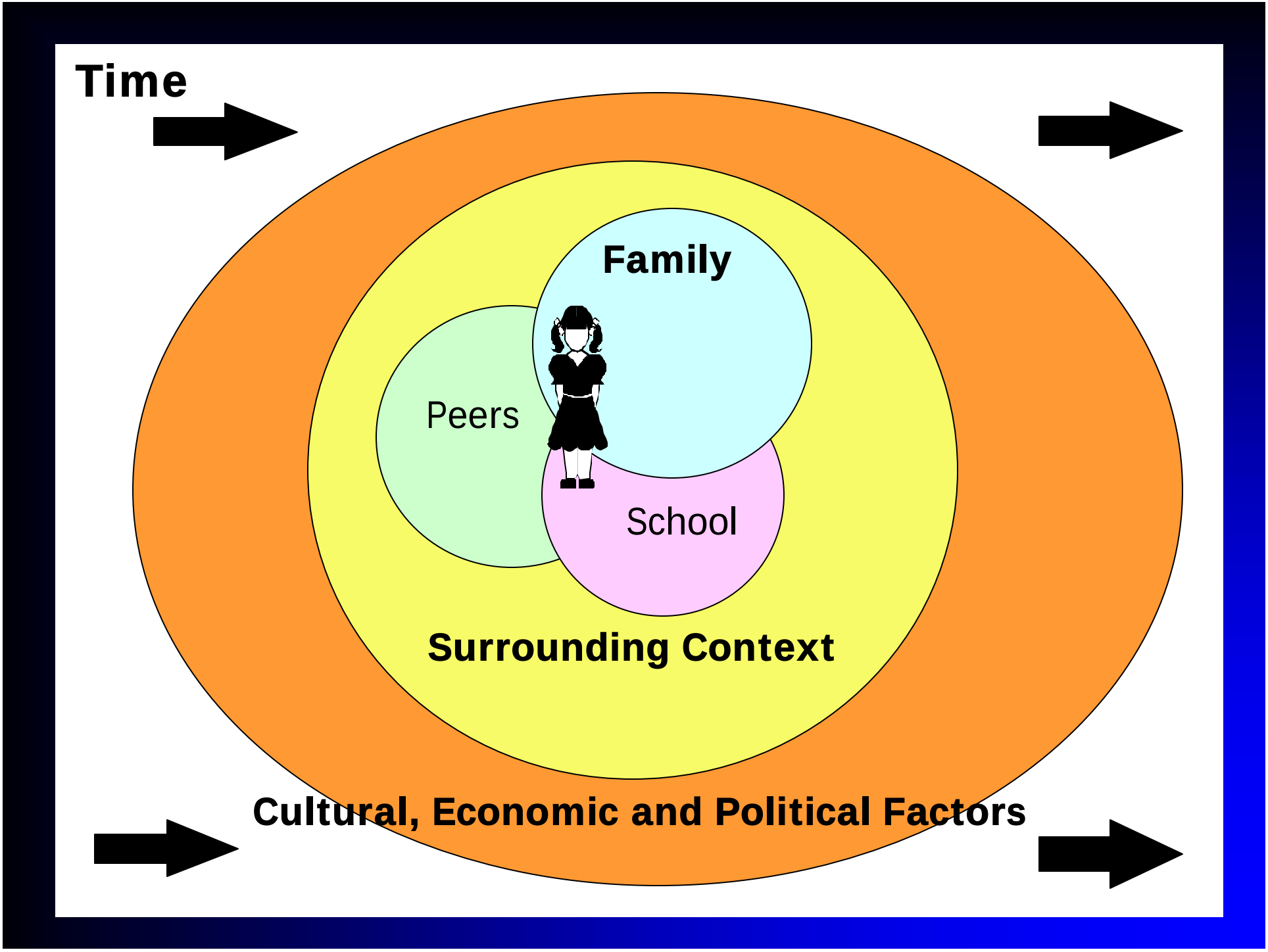

*Tsuang et al., 2001*

# So…What Can We Do To Change The Drug Abuse Trajectory?

Drug abuse *Prevention* can be seen as experimental epidemiology.

# Key Features Of Drug Abuse Prevention Sciences

- First, longitudinal studies have identified Risk and Protective Factors that…
  - predict substance abuse;
  - are nested within the individual and the contexts surrounding the individual;
  - provide potential sites for intervention.


Time
Family
Peers
School
Surrounding Context
Cultural, Economic and Political Factors

# Examples of Risk and Protective Factors

| *Risk Factors* | *Domain* | *Protective Factors* |
|---|---|---|
| Sensation-seeker | Individual | Successful student |
| Child of drug user | | Bonds with family |
| No supervision | Family | Consistent discipline |
| Parent/sibling drug use | | Anti-drug family rules |
| Pro-drug use norm | School | Anti-drug use norm |
| Availability of drugs | | High academics |
| Crime/poverty | Community | Consistent anti-drug messages |
| No afterschool programs | | Strong enforcement of anti-drug laws |



Source: David Hawkins, Seattle Social Development Project

# Modifying Risk and Protective Factors is Central to Preventing Drug Abuse

# Exemplary Cross-Cutting Topic:

## Community-based System of Care

# Communities That Care (Hawkins, et al.)

- Focuses on environmental assessment, community readiness, and implementation of targeted strategies
- Current NIDA randomized clinical study in 26 communities across 7 states

# Community Prevention Planning Using Communities That Care (Hawkins, et al.)

1. ***Mobilize*** **the community**

2. ***Assess*** **the environment (i.e. rates of risk, protection and problem behaviors) through surveys of children and parents which can be mapped**

3. ***Prioritize*** **risk factors and protective factors for action**

4. ***Select*** **tested interventions to address priority risk and protective factors**

# Community Prevention Planning Using Communities That Care (CTC)

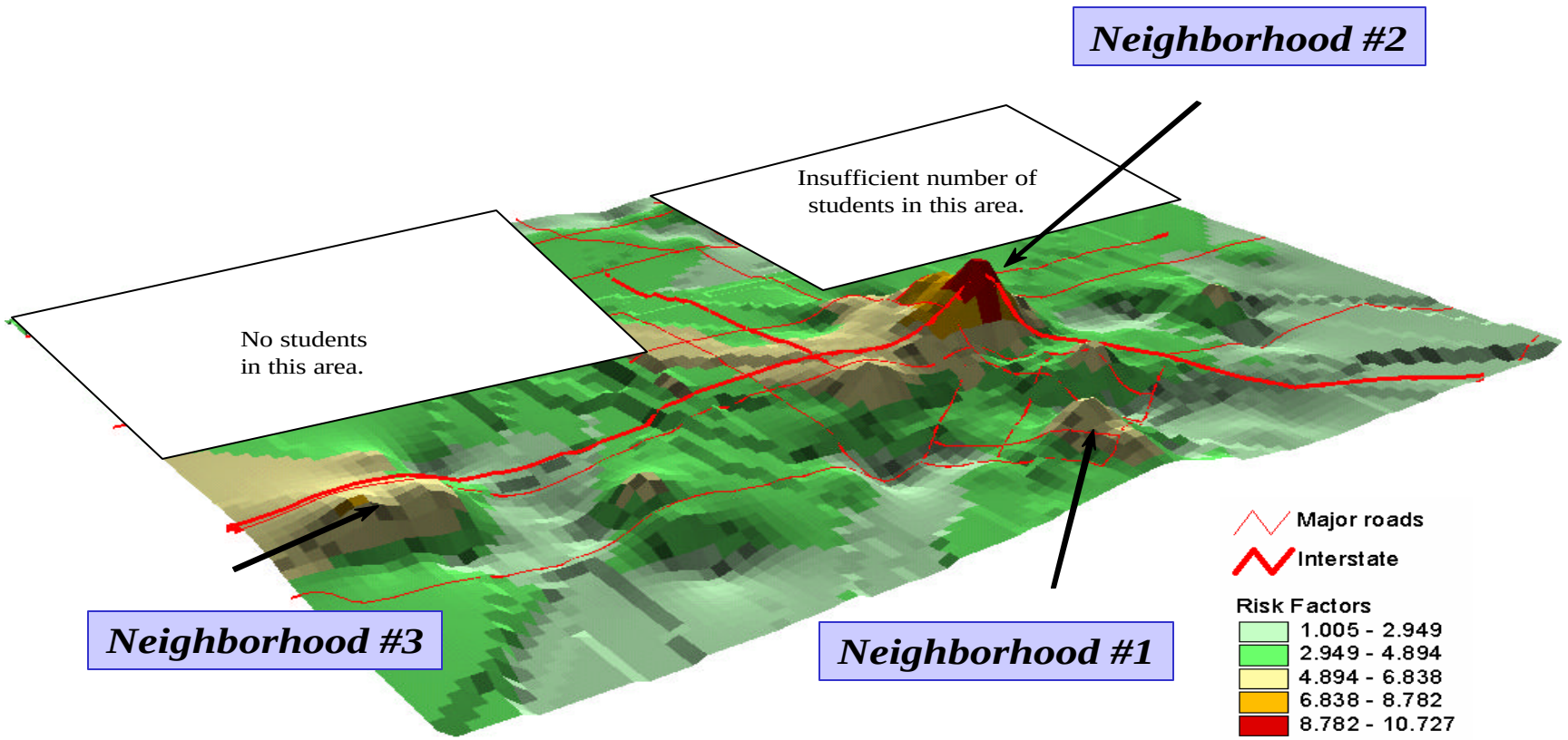
5. ***Implement effectively*** **the interventions**

6. ***Monitor*** **changes in targeted risk and protective factors and problem behaviors**

7. ***Adjust*** **interventions as indicated by performance monitoring data**

1. **Mobilize the community through meetings, activism, identifying and enlisting key stakeholders**
2. **<u>*Assess*</u> the environment (i.e. rates of risk, protection and problem behaviors) through surveys of children and parents which can be mapped**
3. **Prioritize risk factors and protective factors for action**
4. **Select tested interventions to address priority risk and protective factors**

# Mapping the number of risk factors creates a 3-D map:




John A. Pollard, Ph.D. Developmental Research and Programs

# Linkages Among Epidemiology, Prevention and Services Research…

Descriptive Epidemiological studies show us the rates of drug abuse in specific populations and settings.

Longitudinal/Analytic Epidemiology studies provide clues to specific risk factors for drug abuse.

Prevention studies test these risk factors through experimental manipulation.

Services research helps us understand the best strategies to implement these programs.

# Conclusions

- Variation in rates of use/addiction and variation between groups provides clues to causes.
- Gene/environment interactions will likely be essential to understanding causes of addiction.
- Understanding and intervening with risk and protective factors are key to substance prevention sciences.